

Contents

Preface	vii
Conference organization	ix
Supporting organizations and sponsors	x
 REVIEW PAPERS	
Study of strain variation in LEC-grown GaAs bulk crystals by synchrotron radiation X-ray topography J. Matsui	1
Multicrystal X-ray diffraction of heteroepitaxial structures P.F. Fewster	9
Transmission electron microscopy of heteroepitaxial layer structures H. Cerva	19
Control of MBE, MOMBE and CBE growth using RHEED C.T. Foxon	28
Soft X-ray photoelectron spectroscopy of compound semiconductor surfaces and interfaces I.T. McGovern	34
Secondary ion mass spectrometry of dopants and impurities in compound semiconductors: depth profiling of homo- and heterostructure C. Grattapain and A.M. Huber	42
Electrical and optical defect spectroscopy of compound semiconductors H.G. Grimmeiss and M. Kleverman	52
Subpicosecond luminescence spectroscopy of heterostructures (Extended Abstract) B. Deveaud	63
Far-infrared spectroscopy of impurities in semiconductors R.A. Stradling	65
Micro-Raman spectroscopy for characterization of semiconductor devices G. Abstreiter	73
Raman spectroscopy for impurity characterization in III-V semiconductors J. Wagner	79
 TECHNIQUES FOR STRUCTURAL AND COMPOSITIONAL CHARACTERIZATION	
Modelling interdiffusion in epitaxial multilayer structures using X-ray simulation techniques J.H.C. Hogg, D. Shaw and D.M. Staudte	87
Characterization of (In,Ga)As/GaAs strained-layer multiple quantum wells with high-resolution X-ray diffraction and computer simulations R. Zaus, M. Schuster, H. Göbel and J.-P. Reithmaier	92
Assessment of mismatched epitaxial layers by X-ray rocking curve measurements and simulations N. Herres, G. Bender and G. Neumann	97

A combination of high-resolution X-ray diffractometry and diffraction imaging techniques applied to the study of MOVPE-grown $\text{Cd}_x\text{Hg}_{1-x}\text{Te}/\text{CdTe}$ on GaAs A.M. Keir, S.J. Barnett, J. Giess, T.D. Walsh and M.G. Astles	103
Interface roughness of GaAs/AlAs superlattices MBE-grown on vicinal surfaces P. Auvray, A. Poudoulec, M. Baudet, B. Guenais, A. Regreny, C. d'Anterrosches and J. Massies	109
TEM study of the origin of the surface microroughness in DSL photoetched Si-implanted GaAs wafers C. Frigeri, J.L. Weyher and M. De Potter	115
TEM in-situ observation of recombination-enhanced mobility of dislocations in II-VI compounds C. Levade, J.J. Couderc, G. Vanderschaeve, D. Caillard and A. Couret	119
Investigation of surface and sub-surface defects on polished InP substrates using Auger electron spectroscopy coupled to argon ion sputtering P. Ossart and E.V.K. Rao	125
High-depth-resolution SIMS analysis for InGaAs/InP interfaces Y. Gao, I. Ardelean, D. Renard, B. Rose and Y. Jin	131
Optimization of Zn dopant profiles in a pin-diode/FET by combination of depth profiling techniques: a SIMS, ECV and AES study J.G. Bauer, R. Treichler, T. Hillmer, J. Müller and G. Ebbinghaus	138
Improved method for depth profiling of multilayer structures T.S. Horányi, P. Tüttö and G. Endrédi	143
A new, fast method for the computer simulation of CV profiles in multilayer structures J.S. Rimmer, M. Missous and A.R. Peaker	149
Characterization of Cd implanted and annealed GaAs and InP by perturbed angular correlation (PAC) spectroscopy W. Pfeiffer, M. Deicher, R. Keller, R. Magerle, P. Pross, H. Skudlik, Th. Wichert, H. Wolf, D. Forkel, N. Moriya and R. Kalish	154
Defects in CdS:In detected by perturbed angular correlation spectroscopy (PAC) R. Magerle, M. Deicher, U. Desnica, R. Keller, W. Pfeiffer, F. Pleiter, H. Skudlik and Th. Wichert	159
Microscopical studies at cadmium impurities in compound semiconductors A. Baurichter, M. Deicher, S. Deubler, D. Forkel, J. Meier, H. Wolf, W. Witthuhn and ISOLDE Collaboration	165
Structural defect recovery in GaP after heavy ion implantation S.G. Jahn, H. Hofsäss, U. Wahl, S. Winter, E. Recknagel and ISOLDE Collaboration	169
Hydrogen depth profile measurement in $\text{a-Si}_{1-x}\text{C}_x\text{:H}$ films by elastic recoil detection V.Kh. Kudoyarova, G.M. Gusinsky, L.A. Rassadin and I.V. Kudryavtsev	173
Carbon analysis in CdTe by nuclear activation H. Chibani, J.P. Stoquert, M. Hage-Ali, J.M. Koebel, M. Abdesselam and P. Siffert	177
Combined application of SEM-CL and SEM-EBIC for the investigation of compound semiconductors J. Schreiber, W. Hergert and S. Hildebrandt	181
Intensity variations in the near-band-edge recombination of GaP epitaxial layers, grown on (111) and (001) oriented substrates, as observed by cathodoluminescence imaging A. Gustafsson, S. Nilsson and L. Samuelson	186
Cathodoluminescence investigations of RIE-induced defects in InP B.L. Chen, M. Eckstein and H.-U. Habermeier	191
Ultrahigh resolution characterisation of compound semiconductors using pulsed laser atom probe techniques R.A.D. Mackenzie, J.A. Liddle and C.R.M. Grovenor	196
Inductively coupled plasma-atomic emission spectrometry (ICP-AES): an analytical technique for the chemical characterization of perovskite ceramic semiconductors J.C. Fariñas and M.F. Barba	202

OPTICAL CHARACTERIZATION

A study of structural properties of bulk double-doped InP by laser scattering tomography and photoetching R. Fornari, N. Tchandjou, P. Gall and J.M. Lussert	207
Computing errors in Fourier transform photoluminescence A. Antolini and C. Lamberti	212
Theoretical basis for the quantitative characterization of impurities in n-type III-V compound semiconductors by photoelectromagnetic spectroscopy S.D. Baranovskii	218
Characterization of si-GaAs wafer quality by room-temperature photoluminescence M. Baumgartner and K. Löhnert	222
Ambient and low temperature photoluminescence topography of GaAs substrates, epitaxial and implanted layers Z.M. Wang, J. Windscheif, D.J. As and W. Jantz	228
Effect of substrate orientation on the defect-induced bound exciton emissions in GaAs grown by molecular beam epitaxy N. Ohnishi, Y. Makita, A. Yamada, H. Asakura and T. Matsumori	233
Spatial investigation of an iron-doped indium phosphide ingot H. L'Haridon, P.N. Favennec, R. Coquille, M. Salvi, M. Gauneau, Y. Le Guillou, R. Callec and P. Gall	237
Neutron transmutation doping of GaP: optical studies B.J. Heijmink Liesert, M. Godlewski, T. Gregorkiewicz and C.A.J. Ammerlaan	245
Photoluminescence study of proton-implanted $\text{InP}_{1-x}\text{As}_x\text{:Yb}$ J. Tatarkiewicz, A. Kozanecki, Z. Kaliński and K. Paprocki	249
Complex formation in Mn-doped GaP samples T. Monteiro and E. Pereira	253
Three-center Auger effect and the quantum yield of the luminescence of ZnS-based phosphors A. Zakrzewski and M. Godlewski	257
Analysis of impurity distribution in n-GaAs layers by photoconductivity and cyclotron resonance measurements G. Strasser, S. Dubois, M. Besson, E. Gornik, G. Weimann, E. Bauser and H. Riechert	261
Post-transit-time analysis of time-of-flight photocurrents S. Usala, G.J. Adriaenssens, Ö. Öktü and M. Nesladek	265
Time-evolution of low-temperature photoconductivity and Hall mobility in semi-insulating GaAs D.I. Desnica, B. Šantić and U.V. Desnica	269
Interstitial Mn as a new donor in GaP and GaAs: an EPR study S.J.C.H.M. van Gisbergen, M. Godlewski, T. Gregorkiewicz and C.A.J. Ammerlaan	273
Donor-acceptor charge transfers in bulk semi-insulating GaAs as revealed by photo-EPR T. Benchiguer, E. Christoffel, A. Goltzené, B. Mari, B. Meyer and C. Schwab	277
Investigation of reactive ion etch-induced damage in InP surfaces using a noncontact photothermal radiometric probe G.M. Crean, P.A.F. Herbert, I. Little, W.M. Kelly, J.Y. Marzin, A. Izrael and B. Jusserand	281
Semiconductor electrical properties from the frequency dependence of the dielectric constant: application to n-type ZnSe heteroepitaxial thin films A. Deneuville, D.B. Tanner, R.M. Park and P.H. Holloway	285
Reactive-ion-etch damage in GaAs processing evaluated by a microwave absorption technique H.P. Zappe and G. Kaufel	290
Free-carrier concentration in n-doped InP crystals determined by Raman scattering measurements B. Boudart, B. Prévot and C. Schwab	295
Characterization of III-V compounds by quasi-elastic electronic scattering of light B.H. Bairamov, V.A. Voitenko, I.P. Ipatova, V.V. Toporov, G. Irmer, J. Monecke and E. Jahne	300

Determination of elastic properties of Si/Ge superlattices and $\text{Si}_{1-x}\text{Ge}_x$ films from surface acoustic modes by Brillouin scattering	
M. Mendik, M. Ospelt, H. von Känel and P. Wachter	303
O implantation in ZnSe: lattice distortion by Raman measurement	
A. Deneuve, C.H. Park, P. Ayyub, T. Anderson, P. Lowen, K. Jones and P.H. Holloway	308
Raman characterization of passivated GaAs surfaces	
G.M. O'Connor, C.J. McDonagh, F.G. Anderson, T.J. Glynn, G.P. Morgan, G.J. Hughes, L. Roberts and M.O. Henry	312
Confined optical vibrations: a new probe for alloy disorder	
B. Jusserand and F. Molloy	317
Resonant Rayleigh scattering from excitons in $\text{Cd}_x\text{Zn}_{1-x}\text{Te}$:ZnTe quantum wells: measurement of homogeneous linewidths	
J.F. Donegan, J.P. Doran, R.P. Stanley, J. Hegarty, R.D. Feldman and R.F. Austin	321
Electro-optic sampling of surface space-charge fields on III-V compounds	
W. Kütt, G.C. Cho, M. Strahnen and H. Kurz	325
Physical characterization of OMVPE-grown $\text{Al}_x\text{Ga}_{1-x}\text{As}$ multi-layer films by means of non-destructive optical reflectometry	
P.L. Swart, B.M. Lacquet and R. Thavar	330
Picosecond transient photoreflectance measurements of ion-implanted GaAs	
S.C. Moss, J.F. Knudsen, R.C. Bowman, Jr., P.M. Adams and D.D. Smith	337
Reflectometry-aided surface layer investigation	
K. Jezierski, Z. Gumienny and J. Misiewicz	341
Non-destructive characterisation of (Ga,In,Al,As,P)-based ternary multilayer structures using spectroscopic ellipsometry	
C. Pickering, N.S. Garawal, D. Lancefield, J.P. Piel and R. Blunt	346
Alloy disorder effects in III-V ternaries studied by modulation spectroscopy	
A. Dimoulas, A. Derekis, G. Kyriakidis and A. Christou	353
Determination of ion beam etching damage on InP by spectroscopic ellipsometry	
H.W. Dinges, B. Kempf, H. Burkhard and R. Göbel	359
Infrared absorption of n- and p-type Fe-doped InP and mapping of the Fe distribution	
F. Mosel, A. Seidl, D. Hofmann and G. Müller	364
Two-wavelength transmission: a rapid and precise method for measuring the light absorption in semiconductors	
B. Sartorius, M. Brandstätter and H. Venghaus	369
Single-beam thermowave analysis of semiconductors	
M. Wagner, N. Winkler and H.D. Geiler	373

ELECTRICAL CHARACTERIZATION

Microscopic defect level characterization of semi-insulating compound semiconductors by TSC and PICTS. Application to the effect of hydrogen in CdTe	
M. Hage-Ali, B. Yaacoub, S. Mergui, M. Samimi, B. Biglari and P. Siffert	377
Long-term stability of InP MIS devices	
J. Tardy, I. Thomas, P. Viktorovitch, M. Gendry, J.L. Perrossier, C. Santinelli, M.P. Besland, P. Louis and G. Post	383
Hydrogen passivation and reactivation of shallow Zn acceptors in GaAs	
A.W.R. Leitch, Th. Prescha and M. Stutzmann	390
An investigation of photo-quenching properties of LEC GaAs by using optical and electrical techniques	
S. Tüzemen and M.R. Brozel	395
The influence of the DX center on the capacitance of Schottky barriers in n-type AlGaAs	
C. Ghezzi, R. Mosca, A. Bosacchi, S. Franchi and E. Gombia	400

Analysis of electron mobility versus temperature after photoexcitation in Si-doped $\text{Al}_x\text{Ga}_{1-x}\text{As}$ A. Baraldi, C. Ghezzi, A. Parisini, A. Bosacchi and S. Franchi	405
Carrier and mobility profile measurements in n-type ion-implanted GaAs by the differential sheet resistivity and Hall effect technique R. Nipoti, D. Pocci, A. Cetronio and C. Lanzieri	410
Electrical properties of neutron-transmutation-doped InSe B. Mari, A. Segura and A. Chevy	415
Landau oscillations in single quantum wells observed by microwave detection B. Meyer, P. Omling and P. Emanuelsson	420
An investigation of metal/GaAs(100) interfaces by deep level transient spectroscopy L. Roberts and G. Hughes	424

MULTI-TECHNIQUE APPLICATIONS

Characterization of alloy composition in $\text{Ga}_{1-x}\text{Al}_x\text{As}/\text{GaAs}$ structures: comparison of photovoltage, X-ray, SIMS and RHEED techniques D. Lee, S.J. Barnett, A.D. Pitt, M.R. Houlton and G.W. Smith	428
GaSb/GaAs heteroepitaxy characterized as a stress-free system C. Raisin, A. Rocher, G. Landa, R. Carles and L. Lassabatere	434
The relationship between electrical and structural characteristics of CdTe and CdMnTe layers grown on InSb D. Ashenford, J.H.C. Hogg, B. Lunn and C.G. Scott	440
The molecular beam epitaxial growth of $\text{GaAs}(\bar{1}\bar{1}\bar{1})/\text{Si}(111)$: a variable growth temperature study D.A. Woolf, D.I. Westwood, M.A. Anderson and R.H. Williams	445
Strain and defect densities in $\text{Si}/\text{Si}_{1-x}\text{Ge}_x$ heterostructures investigated by ion scattering and X-ray diffraction B. Holländer, S. Mantl, B. Stritzker, F. Schäffler, H.-J. Herzog and E. Kasper	450
Limitations of interface sharpness in a-Si:H/a-SiC:H multilayers R. Schwarz, T. Fischer, P. Hanesch, T. Muschik, J. Kolodzey, H. Cerva, H.L. Meyerheim and B.M.U. Scherzer	456
Correlated use of characterization techniques to optimize the Mg implantation annealing for self-aligned HBT's V. Amarger, C. Dubon-Chevallier, A.C. Papadopoulos, B. Descouts and Y. Gao	462
Electrical characterization of argon-ion sputtered n-GaAs L.J. Bredell, F.D. Aurret, G. Myburg and W.O. Barnard	466
Combined application of spreading-resistance and electron-microprobe depth profiling on GaAs:Zn and Si:P H.-G. Hettwer, W. Lerch, B. Lentfort, N.A. Stolwijk and H. Mehrer	470
Dislocation density, infrared absorption and cathodoluminescence mapping of microstructure associated with dislocation cells in semi-insulating LEC GaAs M.R. Brozel, L. Breivik, D.J. Stirland, G.M. Williams and A.G. Cullis	475
Variation of material parameters along the growth direction of liquid encapsulated Czochralski grown GaAs ingots W. Jantz, R. Stibal, J. Windscheif and J. Wagner	480
Evaluation of the diffusion length of minority carriers in bulk GaAs A. Castaldini, A. Cavallini, E. Gombia, R. Mosca and L. Tarricone	485
Identification of the double and single acceptor state of isolated Ni_{Ga} in GaAs N. Hizem, G. Bremond, L. Mayet, M. Gavand, J. Gregoire, G. Guillot and W. Ulrici	490
Complete identification of the Ti-related levels in GaP P. Roura, J.R. Morante, G. Bremond, T. Benyattou, G. Guillot and W. Ulrici	496
Electronic properties and band structure of IrSe_2 M. Morsli, A. Bonnet, Y. Tregouet, A. Conan, S. Jobic and R. Brec	500

Comparison of pyrite thin films obtained from Fe and natural pyrite powder C. De las Heras, I.J. Ferrer and C. Sánchez	505
Author index	510
Subject index	517